The Nature of Science
Patterns in Heredity

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Program in Science, Technology & Values
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experiment, observation, analysis

actual material world
experiment, observation, analysis

actual material world

paradigms, metaphors, funding...

social communities

experience, observation, analysis
You be the scientist!
You be the scientist!
You be the scientist

Choose one of the four plots on the handout. What patterns can you detect?

Ask for help from your neighbor or from me. Discuss your ideas with your neighbor.
You be the scientist, part II

Ideas or questions about the causes behind the patterns?
You be the scientist, part III

Questions/
Reservations?
Questions or reservations about the process?

- adoption, step-parents
- reliability of data
- outliers
- bringing in extra information
- pattern in the mother-father pairs
- why graph average of parents' heights
- data not collected
- what could one do with any of the patterns?
- what if the data were for IQ?
Chain of steps in scientific inquiry

Phenomenon deemed interesting
  - questions asked
  - categories demarcated
  - observations made
  - data collected
  - patterns perceived
  - predictions made and/or hypotheses about causes
  - social actions supported.
Other kinds of patterns in heredity?
Find the Gene for Whirling Disorder!

When individuals afflicted with Whirling Disorder have children, it is not unusual to have a child who displays the same symptoms. You've decided to study a family with this disorder to try to identify the gene responsible.

You have identified a family in which some individuals have the disorder, and others do not. You've drawn up a pedigree, which is a diagram that shows how family members are related and which individuals have Whirling Disorder.

Here's your challenge:

Below, you'll find genetic puzzle boxes for 12 members of your Whirling Disorder family. Each puzzle has a number that corresponds to an individual in the pedigree above.

Your job is to find the puzzle piece that is responsible for Whirling Disorder.

This is a great way to practice your genetic skills and learn more about the disorder.
also claimed that "feeble-mindedness" was a hereditary condition that could not be changed by alleviating social misery. Further, the "mentally deficient" were less capable of understanding the importance of sanitation (and also more prone to poverty due to their "deficiencies.") Since susceptibility was hereditary, changing the diets of the "unfit" was not warranted. Such measures would artificially prolong their existence and lead to their prolific reproduction.

Controversy over the origins of pellagra continued until the mid-1930's. Ironically, a national catastrophe was necessary to settle the controversy and eradicate pellagra in the United States.

SCXT 320 Science and Racial Prejudice
Consequences of Eugenics--The Contested Etiology of Pellagra--6

Discovering the Pellagra Preventive (PP) Factor

Goldberger spent the rest of his life (he died of cancer in 1929) trying to identify the specific Pellagra Preventive nutritional element. After the stock market crash of 1929, the Great Depression drove many people into unemployment and poverty. Eugenic beliefs in social success as an indicator of hereditary quality were undermined by the national economic catastrophe. Government food relief programs and the manufacture of enriched flour all but eradicated pellagra. The disease is now known to be caused by a deficiency in the Pellagra Preventive element, now known as niacin. As the following table demonstrates, however, deaths from pellagra continued to rise after 1915. It was the widespread poverty of the Depression that led to the policy changes that eradicated pellagra in the United States (and other developed countries).

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Deaths</th>
<th>White Deaths</th>
<th>Nonwhite Deaths</th>
<th>Other Events</th>
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<tbody>
<tr>
<td>1900</td>
<td>2</td>
<td></td>
<td></td>
<td>Pellagra relatively unknown</td>
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<tr>
<td>1914</td>
<td>847</td>
<td></td>
<td></td>
<td>Goldberger discovers pellagra is a vitamin deficiency disease</td>
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<tr>
<td>1915</td>
<td></td>
<td></td>
<td></td>
<td>Mississippi Prison Study</td>
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<tr>
<td>Year</td>
<td>Pellagra Cases</td>
<td>Deaths</td>
<td>Stocks Crashes</td>
<td>Federal Programs</td>
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<td>------</td>
<td>---------------</td>
<td>--------</td>
<td>----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>1916</td>
<td>1058</td>
<td></td>
<td></td>
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<tr>
<td>1917</td>
<td>1807</td>
<td></td>
<td></td>
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<tr>
<td>1918</td>
<td>2843</td>
<td></td>
<td></td>
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<tr>
<td>1919</td>
<td>3126</td>
<td></td>
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<td>1920</td>
<td>2568</td>
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<td>1921</td>
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<tr>
<td>1922</td>
<td>2348</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1923</td>
<td>2514</td>
<td>1143</td>
<td>1102</td>
<td>U. S. Public Health Service begins to record deaths by race. Blacks are 10% of U. S. population but 50% of pellagra deaths.</td>
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<tr>
<td>1924</td>
<td>2206</td>
<td>1086</td>
<td>1120</td>
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<td>1925</td>
<td>3049</td>
<td>1384</td>
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<td>2689</td>
<td>3834</td>
<td></td>
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<tr>
<td>1929</td>
<td>6623</td>
<td>2781</td>
<td>3842</td>
<td>Stock Market Crashes</td>
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<tr>
<td>1930</td>
<td>6106</td>
<td>2722</td>
<td>3384</td>
<td></td>
</tr>
<tr>
<td>1934</td>
<td>3602</td>
<td>1914</td>
<td>1688</td>
<td>Federal work programs and food relief start in 1933. TVA starts.</td>
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<tr>
<td>Year</td>
<td>1935</td>
<td>1936</td>
<td>1937</td>
<td>1938</td>
</tr>
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<td>------</td>
<td>------</td>
<td>------</td>
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</tr>
<tr>
<td></td>
<td>3543</td>
<td>3740</td>
<td>3258</td>
<td>3205</td>
</tr>
<tr>
<td></td>
<td>1963</td>
<td>2129</td>
<td>1804</td>
<td>1707</td>
</tr>
<tr>
<td></td>
<td>1580</td>
<td>1611</td>
<td>1454</td>
<td>1498</td>
</tr>
</tbody>
</table>

TVA dams provide cheap electric power. New grain mills are built. Price of food is reduced.

- 1939: World War II begins in Europe.
- 1941: U. S. enters World War II

U. S. Public Health Service Center for Disease Control, Atlanta, Georgia

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Special Pages On The Various of Web Sites Authored by Karl Loren

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<tr>
<th>OC History</th>
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<td>Witch Doctors Versus Harvard</td>
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<tr>
<td>Calcium</td>
<td>How Bones Grow</td>
<td>Colloidal Minerals</td>
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</table>
Davenport
Good or Bad Scientist?
Chain of steps in scientific inquiry

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    -> categories demarcated
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        -> patterns perceived
          -> predictions made and/or hypotheses about causes
          -> social actions supported.
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Good or Bad Scientist
Chain of steps in scientific inquiry

Phenomenon description
  -> questions
  -> categories
  -> observations
  -> data

Look at:
  • ways people justify decisions at points in the chain
  • influences on those decisions
  • sources of ideas for alternative decisions

...and/or hypotheses about causes
  -> social actions supported.
The Nature of Science

experiment, observation, analysis → actual material world → paradigms, metaphors, funding...

social communities